In the claims:

1. A semiconductor wafer polishing method comprising subjecting a surface of the wafer to vibratory polishing motion, the polishing motion having an amplitude in the range from about 0.05 to about 2.0 mm.

2. The method of Claim 1, wherein the amplitude of the polishing motion is in the range from about 0.10 to about 0.5 mm.

3. A method of polishing a film formed on a workpiece, the method comprising: subjecting the film to vibratory polishing in presence of a chemical slurry at an amplitude in the range from about 0.05 to about 2.0 mm.

4. A method of polishing a thin film comprising features formed by a damascence process on a semiconductor wafer, the method comprising: subjecting the thin film to vibratory polishing motion with an amplitude in the range from about 0.05 to about 2.0 mm.

5. An apparatus for polishing a surface of a workpiece, the apparatus comprising:

(a) a carrier adapted for securely holding at least one workpiece to expose a surface of the workpiece to be polished;

(b) a polishing pad supported on a platen spaced from the carrier;

(c) means for imparting vibratory motion to the platen, the means comprising: a sleeve having mounted thereto a pair of rotary bearings, a first bearing of the pair mounted to the platen and the sleeve, the first bearing having a central axis offset by from about 0.05 to about 2.0 mm from a central axis of a second bearing of the pair, the second bearing mounted to the sleeve and a support frame; and

(d) a drive motor coupled to the sleeve.

6. An apparatus for polishing the surface of a workpiece, the apparatus comprising:

(a) a carrier adapted for securely holding at least one workpiece to expose a surface of the workpiece to be polished:

(b) a polishing pad supported on a platen spaced from the carrier;

(c) means from imparting vibratory motion to the carrier, the means comprising: a sleeve having mounted thereto a pair of rotary bearings, a first bearing of the pair mounted to the carrier and the sleeve, the first bearing having a central axis offset by from about 0.05 to about 2.0 mm from a central axis of a second bearing of the pair, the second bearing mounted to the sleeve and a support frame; and

(d) a drive motor coupled to the sleeve.

7. An improvement in an apparatus for orbital polishing of semiconductor wafers to planarize surface of the wafers, the apparatus comprising a pad mounted in a platen, the platen attached to mechanical means for causing the pad to orbit about an axis offset from a central axis of the pad, the pad spaced from carrier to wafer, the carrier coupled to a drive motor to rotate the carrier, and means for pressing a wafer in the carrier forcibly against the pad, the improvement comprising: offsetting the orbital axis from the central axis of the pad by from about 0.05 to about 2.0 mm to cause vibratory motion when the drive motor rotates the carrier.

8. An improvement in an apparatus for orbital posing of semiconductor wafers to planarize surface of the wafers, the apparatus comprising a pad mounted in a platen; and a carrier spaced from the pad, the carrier adapted for holding the wafer being polished, the carrier coupled to mechanical means for causing the carrier to orbit about an orbital axis offset from a central axis of the carrier; and means for pressing a wafer in the carrier forcibly against the pad, the improvement comprising: offsetting the orbital axis from the central axis of the pad by from about 0.05 to about 2.0 mm to cause vibratory motion when the carrier rotates.

9. An apparatus for polishing a semiconductor wafer, the apparatus comprising:

(a) a wafer carrier adapted for holding at least one wafer to expose a wafer surface to be polished;

(b) a polishing platen spaced from the carrier, the platen adapted to move back and forth linearly with respect to the underside of the carrier; and

(c) a vibration actuator mechanically coupled to impart vibratory motion to the platen with vibratory displacement in a direction at right angles to the back and forth motion of the platen.

10. The apparatus of Claim 9, wherein the vibratory motion has a frequency of from about 2,000 to about 10,000 rpm.

11. The apparatus of Claim 9, wherein the vibratory motion has an amplitude of from about 0.05 to about 2.00 mm.

12. An apparatus for polishing a surface of a workpiece comprising:

(a) a carrier adapted for securely holding at least one workpiece to expose a surface of the workpiece to be polished.

(b) a linear belt polishing pad spaced from the carrier, a polishing face of the belt facing the carrier, and an opposite face of the belt supported by a support plate;

(c) means for imparting vibratory motion to the carrier, the means comprising at least a pair of rotary bearings, the bearings rotating about axes offset from each other to impart vibratory motion to the carrier.

13. The apparatus of Claim 12, wherein the vibratory motion has a frequency of about 2,000 to about 10,000 rpm.

14. The apparatus of Claim 12, wherein the vibratory motion has an amplitude of about 0.05 to about 2.00 mm.

15. The method of Claim 1, wherein a frequency of the motion is in the range from about 2,000 to about 10,000 rpm.

16. The method of Claim 2, wherein the frequency of the motion is in the range from about 2,000 to about 10,000 rpm.

17. The method of Claim 3, wherein the frequency of the motion is in the range from about 2,000 to about 10,000 rpm.

18. The method of Claim 4, wherein the frequency of the motion is in the range from about 2,000 to about 10,000 rpm.

19. The apparatus of Claim 5, wherein the vibratory motion has a frequency of about 2,000 to about 10,000 rpm.

20. The apparatus of Claim 6, wherein the vibratory motion has a frequency in the range from about 2,000 to about 10,000 rpm.

21. An apparatus for polishing workpieces; the apparatus comprising:

a carrier adapted for holding at least one workpiece;

a polishing pad supported on a platen spaced from the carrier, the pad for polishing a workpiece in the carrier; the platen coupled to at least a pair of rotary bearings with offset central axes such that when the bearings rotate, the platen vibrates at a frequency in the range from about 2,000 to about 10,000 rpm.

22. The apparatus of Claim 1, wherein the axes are offset by from about 0.05 to about 2 mm.

23. An apparatus for polishing a workpiece, the apparatus comprising:

a carrier for holding at least one workpiece to be polished;

a platen spaced from the carrier;

a polishing medium interposed between the platen and the carrier, the medium supported by the platen; and

means for imparting a vibratory polishing motion between the carrier and the platen at a frequency of about 2,000 to 10,000 rpm and an amplitude of about 0.05 to about 2.0 mm.

24. The apparatus of Claim 23, wherein the platen is a support plate, and the polishing medium is a polishing belt.

25. The apparatus of Claim 23, wherein the carrier is coupled to a drive motor for rotating the carrier.

26. The apparatus of Claim 23, wherein the carrier is coupled to a drive motor and to means for vibrating the carrier.

27. The apparatus of Claim 23, wherein the platen is coupled to a drive motor.

28. The apparatus of Claim 23, wherein the platen is coupled to a drive motor and to means for rotating the platen.

29. The apparatus of Claim 23, wherein during the polishing, carrier movement comprises orbiting and vibrating.

30. The apparatus of Claim 23, wherein during the polishing, platen movement comprises orbiting and vibrating.